

**NATURAL RESOURCES CONSERVATION SERVICE
CONSERVATION PRACTICE STANDARD**

RANGE PLANTING

(Acre)
CODE 550

DEFINITION

Establishment of adapted perennial vegetation such as grasses, forbs, legumes, shrubs, and trees.

PURPOSES

This practice may be applied as part of a conservation management system to accomplish one or more of the following purposes:

- * Restore a plant community.
- * Provide or improve forage, browse or cover for livestock and wildlife.
- * Reduce erosion.
- * Improve water quality and quantity.

CONDITIONS WHERE THIS PRACTICE APPLIES

On rangeland, native or naturalized pasture, grazed forest or other suitable locations. This practice shall be applied where desirable vegetation is below the acceptable level for natural reseeding to occur, or where the potential for enhancement of the vegetation by management is unsatisfactory.

Land conditions for Planning Range Seeding on Converted Land - Range seeding should be recommended and planned for converted land when:

- a The present land use is cropland or pasture that cannot be maintained due to land characteristics.
- b The land use is cropland or pastureland, and rangeland use is practical for a year-round forage producing program, or to prevent excessive erosion.
- c The land can be established to grass by recognized methods and procedures that are practical, economically justifiable and where satisfactory results may be expected.
- d The degree of erosion has not progressed beyond the ability of normal cultural methods that would be necessary for grass establishment.

CRITERIA

General Criteria Applicable for All the Purposes Stated Above.

- 1 Species, cultivars or varieties selected, must be compatible with management objectives and adapted to climate conditions, soils, landscape position, (e.g., aspect) and Ecological site(s). Refer to Range Tech Note 60 for guidance on selection of adapted species for various soil groups and Sub-Resource areas. This guidance is found in Tables 4, 5, and 6 of the tech note.
- 2 Range seeding in the Southern Desert, MLRA, or areas receiving less than 10 inches annual precipitation require special microclimate modifications to improve

<p>Conservation practice standards are reviewed periodically, and updated if needed. To obtain the current version of this standard, contact the Natural Resources Conservation Service.</p>
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chances of success. Without modifying microclimatic conditions, seeding generally is not recommended. If seedings are to be undertaken, special techniques will be used to reduce soil temperature and/or increase soil moisture available for seedling establishment. Examples include pitting, contour furrowing, imprinting, mulching, or irrigation.

- 3 Origin of Seed - The success of range seeding is strongly influenced by the adaptation of the seed source to local climatic conditions. Released cultivars with known performance and adaptations should be used. When using native harvested seed, seed should not be moved from its geographic origin to its planting location more than 200 miles south, 300 miles north, 200 miles east and 100 miles west. Also, seed originating on sandy soils generally should not be used to seed heavy soils or vice-versa. Introduced species need not meet these limits of adaptation. Certified seed of released cultivars is always recommended over uncertified or native harvested material. Seed certification is the only guarantee as to variety and quality.
- 4 Species, cultivars or varieties selected shall provide adequate cover to control erosion by wind and/or water within an acceptable period of time.
- 5 Seedbed preparation and planting methods will be suitable to meet any special needs for obtaining an acceptable establishment of planted materials.
- 6 Seeding rates will be calculated on a pure live seed (PLS) basis or percent germination.
- 7 Seeding rates will be based on 20 PLS per square foot. See Table-1 for seeding rates of select plant species.

8. Proper depth placement of seed is essential to good stands. Optimum depth of seeding is roughly proportional to seed size.
 - a. One-fourth to one-half inch deep on fine-to-medium textured soils.
 - b. One-half to three-fourth inch deep on sandy loams or loamy sand soils.
 - c. One-to-two inches deep where Indian ricegrass is seeded. When seeding Indian ricegrass over one-inch deep, in a mixture, it will be necessary to overseed the other species. Double seeding will not be required unless over 40 percent of the mixture is Indian ricegrass.

9. Filler Grasses - For broadcast or drilled seedings, up to one (1) pound of either green sprangletop, blue panicum, or sorghum, may be added to a full rate (100%) of a basic mixture of native grasses or a mixture in which most of the grasses are native. Use of filler grass should be considered when reseeding rangeland following mechanical brush control or other operations with complete soil disturbance.

Up to one (1) pound of Yellow sweetclover may be substituted for the filler grass. If Yellow sweetclover is used, the seed should be inoculated.

10. Areas disturbed by dozing or grubbing that are to be re-seeded will be seeded by spot or broadcast using any method that will place the seed in the newly disturbed soil before rain crusts the soil surface. The disturbed area is usually relative to the degree of infestation of the brush. Seeding rates will be adjusted in compensation for the expected natural grass recovery. As a guide to adjustment, expected recovery would be correlated with infestation (except Cholla) prior to control treatment as follows:

SEEDING RATE CORRELATED TO INFESTATION

Heavy infestation
Medium
Light

100% Normal seeding rate
70% Normal seeding rate
50% Normal seeding rate

11. If the area is modified by the treatment to the extent that it needs complete seedbed preparation, the recommended seedbed preparation procedure and seeding rate will be used as outlined in 16e.
 - b. Mixtures of native grasses, or mixtures of native and introduced species may be made to establish a more balanced year round forage supply, and meet the lands needs for preventing erosion and providing cover.
12. A variation of 25% above or below the seeding rate is allowable. For planing purposes, the 100% rate as shown will be used.
13. Seed Quality - In calculating the PLS value of grass seed, the hard seed shown in the analysis will be included in the total germination figure; i.e., an analysis shows "Purity, 58.4%; Germination, 70.14%; Hard Seed, 6.09%; Total Germination, 76.23%." Use the total figure (76.23%) in determining the PLS value. Grass seed germination deteriorates rapidly with age, for this reason seed analysis should be current--no more than one year old.
 - c. Use species that are closely compatible in palatability.
 - d. Use only adapted species for the climate and site as identified on the ecological site description. These should generally be those species that have been shown to be reliable in the past.
 - e. Normally, no more than 3 to 4 species are necessary in a mixture, especially if a filler grass is used. When mixtures are used, the seeding rate will be reduced proportionately. To determine the seeding rate for individual species used in a mixture, multiply the percent of each species in the mixture times the full seeding rate for that species. See Example 1.
14. Planting Dates - Dates of seeding will correspond to the high probability (60 percent or more) of receiving effective precipitation (.6 to 1.0 inch during any three week period) for seedling establishment. See TABLE 2 for planting dates by major land resource area.
15. Pure Stand Seedings and Mixtures - It shall be left to the producer and the technician to determine whether a pure stand or a mixture of grasses will be used. This will depend on the producer's objectives and upon the needs of the land. The following will be considered in planning mixtures and/or pure stands:
 - a. pure stands of native or introduced species may be seeded when it is known that this species will perform well
16. Methods of Seeding and Seedbed Preparation:
 - a. All seeding on rangeland will be drilled or broadcast by any feasible or proven method to ensure good distribution of seed.
 - b. Seeding will be done only when there has been sufficient soil disturbance for a

(reestablish and increase) in providing cover and controlling erosion.

The following considerations should be studied when using mixtures:

- seedbed and adequate covering of the seed.
- c. Seeding will be done only where weed competition is not severe or will be controlled during stand establishment.
 - d. On old cropland fields being seeded to grass or a mixture of grasses and other adapted species, it may be desirable to fertilize for establishment, based on a technical determination at the time of planting. Fertilizer may be applied at the time of planting or delayed until seedlings appear. Fertilize according to a current soils test or with 30 lbs. nitrogen and 30 lbs. phosphorus (P_2O_5) per acre.
 - e. Seeding may be done in conjunction with range pitting, chiseling, or shallow contour furrowing. Rates should be adjusted according to ground disturbance.
 - f. Seeding may be done in conjunction with mechanical brush management, such as tree dozing, grubbing, or root plowing. Rates to be adjusted as noted in 10. Seeding following root plowing may be delayed until the following year if adequate modification is applied at the time seeding is to be done. It is recommended that seedbed modification following root plowing be planned in all cases. Modification may be done by roller chopping, raking, dragging, disking, or packing as needed. This operation may be applied as part of the seeding operation.
 - g. A seedbed for land out of cultivation that can be safely and feasibly tilled may be prepared by establishing a dead litter crop according to criteria for dead litter Crop, 17a.
 - h. Annual vegetation may be killed with contact herbicides to provide a suitable seedbed for the seeding of grasses.
 - i. When drilling or broadcasting seed on firm clean tilled seedbeds, the drill should be followed by press wheels or a packing implement to press the seed into the soil, such as a cultipacker.
17. Methods for Seedbed Preparation on Land Being Converted From Cropland to Rangeland
- a. Establishment of a dead litter crop in which to seed grass.
 - (1) Prepare land as is customary for planting the crop for harvest.
 - (2) Kind of sorghum to use - Forage-type of sorghum or sudan are usually preferred. Sudan, millet or broomcorn may also be used. See TABLE 3 for RECOMMENDED DEAD LITTER CROPS, SEEDING RATES, AND SEEDING DATES.
 - (3) The crop for dead litter will be protected from grazing. Mowing or shredding will be necessary to prevent seed from maturing, or to prevent excessive growth. (Should not be allowed to exceed 4-feet high.) When cut or shredded, leave 10-12" stubble height. A 10-12 inch stubble height should be maintained until grass is planted.
 - (4) Plant the grass at the appropriate time in the undisturbed stubble.
 - (5) Existing dead litter meeting the same requirements for spacing of adequate growth and density, and managed as above, may be utilized. Control competitive vegetation with herbicide or tillage before seeding. On fine-textured soils, existing small grain stubble after grain harvest may be used as a dead litter cover if properly managed. The small grain will be allowed to volunteer. Sweep the stubble as shallow as practicable,

with large sweeps after harvest and subsequently to destroy volunteer small grain and weeds. Small grain and other annual vegetation may be killed with contact herbicide. Seed on firm seedbed in the stubble.

(6) Mulching may be used in the place of a dead litter cover. Mulch material must be applied in accordance with the Standard and Specification for MULCHING.

(7) Normally greater than 500 pounds of dead litter will be required on loamy soils and 1,000 pounds on loamy sands and sandy loams.

b. A dead litter cover will be required for all seedings converting cropland to grass except when grass is irrigated for establishment.

c. Terraces - Old field terraces, without maintenance, usually erode down and/or break due to livestock traffic. They also pond water that "drowns out" many grasses, leaving bare or weedy areas.

Terraces with breaks must either be repaired to work as designed, including adequate height and outlet, or they must be removed altogether. Terraces, if left, must be maintained as needed to serve the intended purpose.

Removal of terraces is accomplished by smoothing to eliminate excess ponding and water concentrations caused by terraces.

18 Planting Methods

a. Drilling. (Applicable to all sites and methods of seedbed preparation except where terrain or obstructions prevent use of drill.)

(1) A grass drill equipped with double disks, depth bands, covering device,

press wheels, seed agitator and a positive rate of speed is preferable.

(2) A grain drill with press wheels can be used for cool season, smooth, heavy seed such as western wheatgrass, if it can be adjusted to deliver the correct amount of seed at the proper depth.

CAUTION: This is not a suitable method for seeding warm season and/or light fluffy seed such as blue grama, sideoats grama, and the bluestems.

(3) Any type of drill is preferable to broadcast seeding. An inert seed dilutant such as rice hulls or cracked grain may be used to facilitate drilling and regulation of seeding rates.

b. Broadcasting - Seeding

(1) When broadcasting is the only feasible method of seeding the following conditions will be met:

(a) Broadcast uniformly and cover seed with drag or preferably cultipack. Cultipacking before and after broadcasting is desirable.

(b) Where brush control was performed mechanically and drilling cannot be done, spot seed by broadcasting on disturbed areas before rain has settled the soil.

(c) On burned areas, broadcast seed following burning before rain has settled the ashes.

19 Management Following Seeding

a. Prescribed Grazing Following Range Seeding All seeded areas will be deferred until the seeded plants are well established. This will always be the first growing season following planting.

Further extended growing season deferments may be necessary to establish or thicken the stand. Light grazing may be possible during the dormant season if plants are sufficiently established so that they will not be damaged. Seeded areas that are within highly intensive one herd grazing system will be excluded from the grazing cycle until the seeded plants have established. However, the technician should be alert for opportunities to utilize the livestock herd to aid in the establishment of the seeded areas, such as a short flush grazing to control a weed competition problem.

b. Weed Control

1 Mechanical Control

- (a) Cutter bar or rotary type mower. Weeds should be clipped prior to bloom stage.
- (b) Cultivation -rotary hoes, or sweeps, are effective in controlling weeds on row plantings.
- (c) Limited controlled grazing may be used to control broadleaf weeds and annual grasses. Livestock numbers should be sufficient to accomplish desired control. Remove livestock if seedling damage occurs.

2 Chemical Control

- (a) Federal, state and local laws govern the use of herbicides; these laws will be checked and complied with in each county.
- (b) Generally, seedling grasses will not be sprayed with herbicides until they are past the four-to-five-leaf state except where current label instructions

specifically allows earlier application.

- (c) Generally, post-emerged herbicide sprays will be applied to weeds when they are seedlings or in a succulent growth stage. Pre-emerged herbicides can be applied during the dormant season. Follow current label instructions.
- (d) Grasses may be damaged if herbicides are applied when air temperature exceeds 95 degrees Fahrenheit.
- (e) The selection of herbicides and application will be based on current label instructions.

- c. Management - Do not graze or cut for hay during the first two growing seasons or until stand is well established, unless limited controlled grazing will benefit the grass by removing competition. After establishment, standard and specifications for prescribed grazing in Section IV of the Field Office Technical Guide will be used as a guide.

*A single species or mixture of forbs or woody shrub seed may be added to the total grass seed mixture at a rate of 1/4 to 2 pounds PLS broadcast. Caution should be exercised in determining the seeding rates in order to get a sufficient stand but not so thick a stand that would have a weedy effect. It may be desirable to seed forbs or woody plants in strips.

14. Treating Disturbed Areas on Rangelands - Applicable to those areas that are disturbed by such activity as pipelines, road ditches, roads, surface mined areas and related activity. See Standards and Specifications for Critical Area Planting.

Additional Criteria for Improved Forages for Livestock.

Selection of a species or combination of species shall be designed to meet the desired nutritional and palatability requirements for the kind and class of livestock.

Selection of species or combination of species shall be designed to meet the desired season of use or grazing period.

Additional Criteria for Improved Water Quality and Quantity.

Select a species or combination of species that will maintain a stable soil surface and increase infiltration.

Species that have high evapotranspiration rates, such as some woody species and phreatophytes, shall not be planted when watershed yields are the primary objective.

A mixture of shrubs and trees indigenous to the site shall be planted when riparian area, stream bank stability and water temperature criteria are important.

Additional Criteria for Improving Forage, Browse or Cover For Wildlife.

Selection of planted species shall meet dietary and palatability requirements for the intended wildlife species.

Species will be selected and planted in a designed manner that will meet the cover requirements of the wildlife species of concern.

CONSIDERATIONS

Planting materials selected should contribute to wildlife and aesthetics when opportunities exist.

Other practices such as Brush Management, Pest Management (weed control), or Grazing Land Mechanical Treatment may be used to promote a satisfactory site preparation to insure a successful range planting.

Use of certified planting materials should be encouraged; however, distance and source limitations on seed and planting stock should be considered in terms of logistics and costs.

Any special handling requirements for planting materials need to be followed for best results, (e.g., beards or awns on seed, hard seed coats, and seed mixture ratios).

PLANS AND SPECIFICATIONS

For standard plantings, Conservation Practice Job Sheet 550 may be used to develop specifications and documentation. Plantings that require more detailed information may require additional site specific specification be prepared. Other practices may be required in support of range planting. Supporting practice specifications must also be developed.

OPERATION AND MAINTENANCE

Operation: Identify any required items needed to assist in stand establishment such as mowing, burning, flash grazing and herbicides to control weeds. Address insect and disease control needs where they are likely to create establishment problems.

Maintenance: Any necessary replanting due to drought, insects or other uncontrollable event which prevented adequate stand establishment should be addressed as soon as possible. Recommendations may vary from complete re-establishment to overseeding or spot replanting. Thin stands may only need additional grazing deferment during the growing season.

TABLE - 1
PLANTING RATES IN LBS. PER ACRE
(BASED ON 20 PURE LIVE SEED (pls) BASIS OR PERCENT
GERMINATION)

Species (Preferred Variety)	Drill or Broadcast PLS
<u>Cool Season</u>	
Arizona Fescue (Redondo)	4.0
Crested Wheatgrass (Hycrest)	3.0
Crested Wheatgrass (Nordan)	5.0
Indian Ricegrass (Paloma)	6.0
Intermediate Wheatgrass (Amur, Tegmar)	9.0
Pubescent Wheatgrass (Luna)	11.0
Tall Wheatgrass (Jose)	11.0
Slender Wheatgrass (Primar & San Luis)	6.0
Thickspike Wheatgrass (Critana)	6.0
Western Wheatgrass (Arriba, Barton)	8.0
Great Basin Wildrye (Magnar)	5.7
Bottlebrush squirreltail (Tusas)	8.8
<u>Warm Season</u>	
Alkali Sacaton (Salado)	1.0
Big Bluestem (Kaw)	5.0
Buffalograss Burs (Texoka)	16.0
Hulled	3.0
Blue Panic	2.0
Black Grama (Nogal)	1.0
Blue Grama (Hachita, Lovington, Alma)	1.5
Galleta Caryopsis (Viva)	2.0
Floret (Viva)	6.0
Green Sprangletop (Marfia)	1.7
Spike Muhly (El Vado)	1.0

**Species
(Preferred Variety)**

**Drill or
Broadcast
PLS**

Warm Season

Indiangrass (Llano)	5.0
Kleingrass (Selection - 75)	2.0
K.R., Caucasian, Yellow/Old	1.2
World Bluestem (Ganada, Plains)	
Lehman Lovegrass (NM.317)	0.5
Little Bluestem (Pastura)	3.4
Sand Bluestem (Elida) 7.0	
Sideoats Grama (Niner, Vaughn)	4.5
Sand, Mesa, Giant Dropseed	0.5
Sand Lovegrass (Bend) 1.0	
Switchgrass (Alamo, Blackwell)	3.5
Weeping Lovegrass (Morpa, Ermelo)	1.0
Atherstone Lovegrass	1.0
Plains Lovegrass	1.0
Cane Bluestem (Grant) 1.2	

Shrubs and Forbs

*Winter Fat (Hatch) (Broadcast only)	0.5
*Four Wing (Rincon, Santa Rita)	0.5
Dewinged	
Penstemon, Rocky Mountain (Bandera)	3.0
Penstemon, Palmer (Cedar)	3.0
Penstemon, Narrowleaf (San Juan)	3.0

*Do not reduce this rate when used in a mixture.

TABLE 2
PLANTING DATES BY MAJOR LAND RESOURCES AREA

<u>Resource Area</u>	<u>Planting Date</u>
HP-1, CP-1, HP-2 & 3	January 1 to August 1
CP-2, 3, 4, WP-1, 2, 3, RM-1, 2, AN-1, 2, 3, HV-1, 2*,	January 1 to May 1, June 15 to August 1
ND, SD, 1, 2, 3	June 15 to August 3.

*Dormant fall cool season seedings (seeded late enough so seed does not germinate until spring) are satisfactory in WP-1 & 2, RM-1, RM-2, AN-1, 2, & 3, HIV-1, 2, and HP-1, & 2. Treatment of seed with a fungicide to prevent seed deterioration is recommended.

(See Range Technical Note No. 50, the attached New Mexico Map of Mean Monthly Temperature and Precipitation at selected stations, and bulletin "Probability of Selection Precipitation Amounts in New Mexico.")

If local conditions justify, the dates of planting may be adjusted by the State Rangeland Management Specialist.

TABLE - 3
RECOMMENDED DEAD LITTER CROPS, SEEDING RATES, AND SEEDING DATES

Crop	Wind Erodibility Group WEG)	Rates lb/ac*	Date
Millets	All WEG	8	5/1 - 8/1
Millets	All WEG	8	5/1 - 8/1
Forage Sorghum	All WEG	8	5/1 - 8/1
Milo	All WEG	8	5/1 - 8/1
Wheat	WEG 3 or Greater	40	8/1 - 10/15
Rye	WEG 3 or Greater	40	8/1 - 10/15
Barley	WEG 3 or Greater	50	8/1 - 10/15
Oats	WEG 3 or Greater	45	8/1 - 10/15

* A variation of 25% above or below the seeding rate is allowable. For planning purposes, the 100% rate as shown will be used.

Planting methods: Drill in rows not to exceed 10 inches wide.

Fertilization: If fertility is known to be a problem, fertilize in accordance with soils test.

EXAMPLE 1

EXAMPLE FOR A SEEDING MIXTURE FOR LOAM ECOLOGICAL SITE
PLANNED FOR SIDEOATS GRAMA, WESTERN WHEATGRASS AND BLUE
GRAMA.

Sideoats Grama	4.5 lb. seeding rate/per acre 40% of 4.5	.80 lb. PLS
Western Wheatgrass	8 lb. seeding rate/per acre 20% of 8	1.60 lb. PLS
Blue Grama	1.5 lb. seeding rate/per acre 40% of 1.5	0.60 lb. PLS